

Mobility of Top Incomes in Germany

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November 2014

Abstract

I analyze German top income mobility using micro-level panel data of personal income tax returns which are highly representative for top income taxpayers for the years 2001–2006. Top income mobility is assessed in three dimensions: (i) persistence in top income fractiles and its stability over time, (ii) measures of individual mobility that are not dependent on the fractile size: the degree of mobility between equally sized groups and mobility in ranks, and (iii) mobility's impact on top income shares. Persistence in top income fractiles is comparatively high and fairly stable across the analyzed period. Top income recipients are less prone to downward mobility and see less variation in annual ranks than less rich tax units. Mobility's impact on income concentration is moderate. The top percentile's share is reduced by roughly 5 % over six years.

Keywords: income distribution, inequality, top incomes, income mobility

JEL-classification: D31 D63

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*I thank two anonymous referees, the editor, Rolf Aaberge, Giacomo Corneo, Joël Hellier, Christoph Schinke, Ronnie Schöb, Christoph Skupnik, Viktor Steiner, Michael Stops, as well as participants of the 11th workshop in public economics at WZB Berlin, of the 2012 INFER, MONDES, and IIPF conferences, of the 9th Winter School on Inequality and Social Welfare Theory (Canazei 2014), of the 2014 SEEK conference, and of the 2014 Conference on Public Economics of Inequality (Berlin) for comments and advice. I also thank the Destatis Research Data Center's staff and especially Rafael Beier for provision of remote execution access to the microdata

1 Introduction

Income mobility provides a short way from rags to riches. A highly mobile society can be seen as a goal in its own right, as it generates openness of society. A second, instrumental property of income mobility is that it reduces income inequality. The more mobile a society is in terms of income ranks, the more equal it is, given the annual income distribution.

With rising income concentration in many industrialized countries, top incomes have come into focus. Income concentration is measured by the share in total household income that top income fractiles receive. The US saw the most pronounced increase in income concentration: The share of total household income received by the income richest percentile of the population rose from 8.9 % in 1976 to 23.5 % in 2007 (Alvaredo et al., 2014, Piketty and Saez, 2007, Saez, 2013). Other Anglo-American countries saw a similar, but less pronounced increase in income concentration. Concentration in Continental European countries has increased to a lesser degree (Atkinson et al., 2011). In Germany, annual concentration has increased since the 1990s (Bach et al., 2009, 2013, Bartels and Jenderny, 2014, Dell, 2011).

Several arguments may prove income concentration undesirable. First, a large share of Western countries' citizens seem to have preferences for an equal income distribution.¹ Second, rising income concentration comes along with rising relative deprivation.² Third, a strong economic elite might gain concomitant political power that conflicts with our democratic ideal.³ Finally, the share of economic growth that accrues to the richest persons has an impact on how growth can be interpreted. If high macroeconomic growth does not lead to better living conditions for the bottom 99 % of the population, growth is challenged as an indicator of welfare.⁴ The strength

¹Redistributive preferences seem to be stronger when the income level depends on luck rather than effort (Alesina and Giuliano, 2009). Several arguments suggest that ability and effort can not fully explain the level of top incomes, such as the superstar theory (Rosen, 1981). Roine and Waldenström (forthcoming) survey explanations for top compensations.

²According to this originally sociological concept, the welfare loss resulting from not having something rises with the number of persons who do have it. With given average income, relative deprivation rises with rising inequality (Yitzhaki, 1979).

³One channel for this power can be influence on the media: media capture by the government can affect political outcomes (Besley and Prat, 2006). A media bias in favour of firms is more likely to occur when concentration in firm ownership is high (Corneo, 2006).

⁴The crucial role of income concentration for distributional questions is the focus of two recent OECD publications: First, a literature review on top incomes and tax policy implications (Matthews, 2011). This study is

of these arguments depends on the degree of income mobility. The equity argument loses force if the equalizing effects of income mobility are strong: if families move between income ranks from one year to the next, medium or long-term incomes are more equally distributed than annual incomes. Similarly, political power of an economic elite clearly depends on the persistence of that group: in a mobile society, economic power shifts between persons. Hence, the individual's power is less pronounced than the annual income concentration would suggest. Thirdly, macro-economic growth benefits a larger portion of households if income mobility is high, given the degree of annual concentration. With sufficient income mobility, high concentration in annual incomes may thus come with a relatively equal distribution of medium and long-term income. If this is the case, high annual income concentration is less problematic from a normative perspective. The share of the richest fractiles' members then declines with the period over which income is measured, and the group of persons or households that form the annual rich over several years is larger than the annual fractile itself.⁵

This paper aims at assessing the degree of income mobility among top income recipients in Germany and its impact on income concentration. Is the income elite prone to downward mobility? Does economic power shift between persons, or is the richest group a persistent one? Is the income distribution in Germany as unequal as annual results suggest, or is high annual concentration offset by high income mobility?

Four main findings are obtained. First, German top income mobility is fairly constant over the analyzed period (2001–2006). Second, persistence rates in annual top income fractiles after one and after three years in top income fractiles are in general somewhat higher than Canadian, French, and US results. After one year, German persistence rates are of comparable magnitude to those observed in France for the top 0.1%. Third, income recipients at the very top are not exceptionally prone to downward mobility. As the highest fractiles are tiny, it is a matter of statistics that these groups see a proportionally high exchange of members. By contrast, when

reproduced in the second publication and put into a wider distributional context that explores the driving forces behind increasing income inequality (OECD, 2011).

⁵This argument has been advanced as an objection against the findings that income concentration has increased: if mobility has also increased during the past decades, it might have offset the increase in annual income concentration. Atkinson et al. (2011) discuss this objection and propose further research on income mobility at the top.

mobility is assessed on the basis of equally sized groups or absolute rank changes, members of the richest top income fractiles are less mobile than less rich tax units. Fourth, concentration results for average incomes correspond closely to annual results. More than 94 % of annual concentration in the top 1 % persists in permanent incomes over six years, even when capital gains are captured by the income concept used. Detrimental effects of income concentration as described above may therefore well apply to Germany.

The remainder of the paper is organized as follows: section 2 reviews the literature on top incomes and on income mobility. Section 3 describes (i) the database used to assess German top income mobility, (ii) the economic income concept derived from taxable income, and (iii) the method of defining top income groups. It also gives (iv) some details on tax changes during the time period of the dataset. Section 4 presents the analysis of income mobility which analyzes (i) downward mobility out of top income fractiles and changes in mobility over time, and presents (ii) measures of individual mobility that are not dependent on the fractile size. Section 5 shows the impact of top income mobility on top income shares. Section 6 summarizes the results.

2 Literature

2.1 Snapshot Literature on Top Incomes

Literature on top incomes relies largely on repeated cross sections. The dominant strand of the literature constructs long-term time series of income shares of the richest top income fractiles, usually based on annual income tax records. Income concentration is defined as the share of an external income total that a given top income fractile receives. In his seminal work, Piketty (2001, 2003, 2007) constructs long-term top income and wealth share series over the 20th century for France. The income share of the richest 1 % of French income tax units declined during the first half of the century and did not reach its pre-WWI level thereafter. In the US, top income shares followed a U-shaped pattern from 1913 to 2002, with high wage incomes driving the rising inequality during the last three decades of the century (Piketty and Saez, 2003, 2007). Similar results have been found for Canada and the UK (Atkinson, 2007, Atkinson and Salverda,

2005, Saez and Veall, 2005, 2007). Swedish top income shares also fell substantially over the 20th century and increased again since the mid 1980s, primarily driven by capital gains (Roine and Waldenström, 2008, 2010, 2012). For the Netherlands, long-term series do not suggest a recent increase in the top percentile's share (Atkinson and Salverda, 2005, 2007, Salverda, 2013). German income concentration has been comparatively high throughout the second half of the 20th century. While earlier series suggested stable income concentration in the post-war era, top income shares have increased since the late 1990s (Bartels and Jenderny, 2014, Dell, 2005, 2007, 2011).

Long-term series of top income shares have been constructed with a common methodology for more than 25 countries.⁶ In most of these countries, rising shares of the top income groups have been found since the 1980s, even though both the magnitude of the increase and the driving income sources behind it differ substantially across countries. While the US experienced the strongest increase in top income shares, concentration in European countries increased to a lesser degree.⁷

For more recent time periods, microdata of income tax files are available for some countries. These data have two advantages over tabulated tax records: First, top income shares can be assessed directly and do not need to be calculated on the basis of distributional assumptions. Second, it is possible to conduct simulations or corrections, e.g. regarding the income definition or the unit of analysis. In turn, the time series provided by microdata are shorter than those based on tabulated tax records. For Germany, microdata have been used to construct a measure of gross income from the individual tax units' taxable incomes for several years between 1992 and 2005 (Bach et al., 2009, 2013).⁸ This reconstructed gross income is less dependent on the tax law than taxable income. Like the series that rely on tabulated tax statistics, these series document

⁶The first 22 country-studies have been included in the two collective volumes edited by Atkinson and Piketty (2007, 2010). Results for these 22 countries and additional countries are collected and continuously updated in the World Top Incomes Database (WTID, Alvaredo et al., 2013). An introduction to the literature and recent survey provide Roine and Waldenström (forthcoming). Income concentration results from the WTID for a selection of countries in the period analyzed in this paper is represented in Figure A.1 in Appendix A.

⁷Even though most of these long-term series on top incomes rely on income tax data, other data sources and income definitions have been used. Long-term top earnings series for the UK based on survey data show rising inequality in top earnings since the late 1970s (Atkinson and Voitchovsky, 2011).

⁸Bach et al. (2009, 2013) use an integrated dataset that relies on both income tax files and population survey data.

an increase in top income shares. In particular, the share in gross market income of the richest 0.01 %, grew by about 50 %. The share of the richest 0.001 %, referred to as the economic elite, more than doubled. Microdata have also been used to harmonize the original series by Dell (2011) with respect to the definition of taxable capital income, which enforces the concentration trend of the raw-data series (Bartels and Jenderny, 2014). Several series on top income shares in Germany thus suggest a substantial rise in German income concentration since the early nineties. Series from French microdata show a similar trend: the income share of the top percentile has increased since the late 1990s (Landais, 2008).

2.2 Literature on Income Mobility

Literature on income mobility is complicated by a diverse and not consistent set of mobility definitions.⁹ Empirical studies on intragenerational income mobility have been carried out predominantly on the basis of survey data which often consist of panel data over several decades and include detailed sociodemographic information. These surveys usually are representative for low and medium-income households and have been used to analyze mobility in these income ranges.¹⁰ For the intragenerational level, Burkhauser and Couch (2011) review both mobility measures and recent contributions to the literature. In particular, some of these contributions examine the degree to which annual inequality differs from inequality in average incomes over longer periods: most of the reduction in inequality takes place in the first few years, and changes in mobility over time are low.¹¹

Research on income mobility of top incomes is comparatively scarce, as panel data on high incomes are rare and often hard to obtain. On the intragenerational level, top income mobility has been analyzed for Canada, the US, France, and Norway (Aaberge et al., 2013, Auten and

⁹For a recent and comprehensive review of the literature on income mobility, see Jäntti and Jenkins (forthcoming).

¹⁰Using the socioeconomic information, surveys have also been used to estimate determinants of poverty. Jenkins (2011) provides a methodological overview and detailed results for Britain.

¹¹Earlier reviews on the intragenerational level examine motivations behind the early literature and concomitant methods (Atkinson et al., 1992, Fields and Ok, 1999). For the intergenerational level, Solon (1992) is methodically seminal. He measures the intergenerational income elasticity between fathers and sons in the US controlling for age profiles and finds a high elasticity of 0.4. A recent extension of this study suggests that intergenerational mobility in the US did not change during the last decades (Lee and Solon, 2009). For a recent review see Black and Devereux (2011).

Gee, 2009, Auten et al., 2013, Landais, 2008, Saez and Veall, 2005, 2007).¹² All analyses use micro-level panel data of income tax returns. The Norwegian data are the most extensive and span the years from 1967 to 2011. The Canadian data span the years from 1982 to 2000. The French data cover the period from 1998 to 2004. For the US, two different data sources are used. The first analysis looks at the two years 1996 and 2005 (Auten and Gee, 2009). The second analysis uses panel data on income tax returns from 1987 to 2010 (Auten et al., 2013).

The existing analyses of top income mobility predominantly use two methods. First, top income shares of annual incomes are compared with top income shares of permanent incomes. Permanent incomes are defined as average incomes over a certain period of time. This method assesses the impact of income mobility on income concentration and has been applied to Canadian and Norwegian data (Aaberge et al., 2013, Saez and Veall, 2005, 2007). For both Canada and Norway, concentration of annual incomes and permanent incomes over three years (Canada and Norway) and five years (Canada) show little differences. In particular, the intertemporal patterns of income concentration of annual and permanent incomes closely correspond.¹³

The second mobility measure used in the top income literature is the probability of remaining in a given annual top income fractile after a given period of time. For Canada, France, and the US, this probability has been compared over time and for periods of different lengths. The two former analyses find relatively stable probabilities of remaining in the top 0.1 % after one, two, and three years: For Canada, the probabilities are roughly 60 %, 50 %, and 40–50 %; for France, 65–69 %, 50 %, and 40 %. For the US, the probabilities of remaining in the richest 1 %, the richest 0.1 %, and the richest 0.01 % after nine years are 35.3 %, 23.9 %, and 23.4 % (Auten and Gee, 2009).¹⁴

¹²On the intergenerational level, the Swedish top income mobility has been shown to be very low between fathers and sons. The intergenerational income elasticity above the top 0.1 % quantile amounts to 0.9 which is very high and likely to be driven by wealth transmission (Björklund et al., 2012).

¹³Aaberge et al. (2013) define two additional mobility measures based on the income share difference between annual and permanent income: The top income mobility (TIM) curve $T(u)$, which measures the absolute difference between the average annual and the permanent income share of the population above the percentile point u , and its first derivative $T'(u)$, which measures the income reduction due to mobility for a taxpayer at a given percentile point, measured in multiples of the total distribution's average income. They show that $T(u)$ was stable in the 1970s and 1980s and increased from 1991, mirroring rising top income shares. The analysis of $T'(u)$ shows that the income reduction due to mobility predominantly occurred inside the top percentile. In addition, the authors axiomatically derive dominance criteria for top income mobility and test for dominance between time periods. They also examine the impact of the time horizon and life cycle effects.

¹⁴Probabilities for the richest 1 % and the richest 0.1 % refer to the disjoint groups P99-99.9 and P99.9-99.99. For

Shorter time periods were analyzed for the richest percentile between 1991 and 2009 (Auten et al., 2013). There, the persistence after one year ranges predominantly between 60 % and 70 %. After two and three years, persistence ranges roughly around 50 % and 40 %, respectively. However, the US results are not directly comparable to the Canadian and French results. In the first analysis (Auten and Gee, 2009), the time period is much longer in the US case. In the second analysis (Auten et al., 2013), probabilities of remaining in the top percentile are conditional on survival in the previous periods which results in lower probabilities after two or more years. The only comparable figure is the probability to stay in the top percentile after one year, which is higher in Canada (around 80 %) than in the US. For Germany, survival in the top quintile has been analyzed by Merz and Zwick (2008), who use panel data of individual income tax files between 2001 and 2003 to examine differences in mobility between self-employed persons and wage earners. About 21 % of the top quintile members persist after two years. However, Merz and Zwick (2008) do not look at mobility in higher top income fractiles.

The existing empirical literature on German top income shares above the top quintile thus relies on cross-sectional tax data (Bach et al., 2009, 2013, Bartels and Jenderny, 2014, Dell, 2005, 2007, 2011). I contribute to the current debate by using panel data on personal income tax returns on the micro level to explore the income mobility of top income recipients. First, in order to assess the extent and stability of income mobility between the fractiles, I analyze probabilities to stay after several time periods, as it has been done for Canada, France, and the US. To control for the statistical effect that persistence in small fractiles is lower than persistence in large fractiles, I extend the analysis to mobility between equally-sized subgroups, and mobility in ranks. Second, I explore the impact that inter-fractile mobility has on income concentration as measured by top income shares.

the overlapping fractiles P99-100 and P99.9-100, probabilities of remaining in these groups would be expected to be higher. (Auten and Gee, 2009) compute drop-out rates instead of the here reported probabilities to stay.

3 Database and Data Management

3.1 Database

The German Taxpayer Panel (TPP) is a six-year panel of annual personal income tax (PIT) returns on the micro level. It is a stratified 5 % sample of a balanced panel of all German income tax returns over the period 2001–2006, compiled by the German Federal Statistical Office (Destatis). For each tax unit, the data contain all tax-relevant information for each of the six years. A tax unit can either be a single person or a married couple. In Germany, filing an income tax return is mandatory for entrepreneurs, self-employed persons, and recipients of other non-wage income above certain thresholds. Filing is not mandatory but favorable for other high and medium and some low-income tax units. Tax units with incomes above the mean are therefore overrepresented both among income tax filers and in the sample population.¹⁵ Unlike the cross-sectional income tax data, the panel dataset is balanced and thus contains only tax units that filed a return in all six years. Not included are thus tax units that started filing after 2001 or stopped filing before 2006. Amongst top taxpayers, who usually have a significant share of non-wage income, tax units are unlikely to stop filing. Exceptions, however, are possible because of death, migration, or marriage. If two single tax units marry, one of them loses his or her tax ID, which then drops from the panel completely.

Out of that restricted population, the sample contains 5 % of all income tax filers, that are weighted to match the panel population. This results in an unweighted total of 928,993 tax units and a weighted total of about 18.5 million tax units. However, the sample contains 85 % of all high-income filers, defined as tax units whose average annual gross taxable income (GTI) exceeds 150,000 €. This high-income group represents only 1.5 % of weighted observations (286,199), but it corresponds to 26 % of unweighted observations (243,260). Thus, high-income tax units are highly oversampled, which provides a reliable basis for the analysis of income concentration. Sampling strata are regions (federal states), assessment type (single/married couple),

¹⁵Tax units that obtain exclusively wage income often do not file and are thus only partly included in the panel. In addition, households that do not pay income tax at all, like some pensioners or recipients of governmental transfers, are not included.

main income source (business/wage/other), average annual GTI as well as the GTI's coefficient of variation. As each tax unit is observed in all six years, sampling weights are constant for all years. The TPP contains detailed information on seven income types: wage income, three types of entrepreneurial income, capital income (defined as interest and dividends), income from renting and leasing, and other income, including pensions. Capital income below a certain allowance¹⁶ is not taxable and therefore not reported in the majority of the respective files. Capital gains are only partly included, and only in the period of realization.¹⁷

The TPP covers the years 2001–2006. This was a period of several tax reforms and huge changes in overall inequality in Germany, both of which may have an impact on the results. The top marginal tax rate was reduced from 51 % to 48.5 % in 2001, to 45 % in 2004, and to 42 % in 2005. In 2007, a new highest tax bracket with a much higher threshold income was introduced. In this tax bracket, the top marginal tax rate was raised again to 45 %. For top income recipients, it was thus most favorable to realize incomes in 2005 and 2006. In both years, incomes are indeed more concentrated in the top fractiles (see Table B.1 in Appendix B). During the data period, only the year 2002 is neither a pre-reform nor a post-reform year. In addition to these tax rate changes, overall inequality of incomes in Germany increased substantially from 1999 to 2005, primarily due to growing inequality in labor incomes. This has been documented in several studies.¹⁸ The data period is thus a period of growing labor income inequality and several tax reforms. Taxable incomes reported in the data are likely to reflect both developments.

¹⁶The allowance varied between 1,370 € and 1,550 € per person over the data period.

¹⁷Capital gains from selling a business enterprise have high allowances under certain circumstances, but are nonetheless documented in the data. Capital gains from financial assets were tax-exempt until 2008, if the assets had been held for a minimum period of one year. These capital gains are not documented in the data. Another special case are capital gains from selling shares of a corporation, if the tax unit owns at least 1 % of the corporation's capital (usually shares of closely held corporations). These capital gains were always taxable to some degree and are therefore documented in the data. Capital gains from real estate are tax-exempt if the estate has been held for more than ten years and then are not documented in the data either.

¹⁸From 1999 to 2005, the Gini coefficient of equivalent net income rose by about 4 percentage points in West Germany and by about 3 percentage points in East Germany. Growing unemployment and the Hartz labor market reforms (since 2003) have been suggested as main driving factors. Both have triggered low-pay employment which produced growing wage and income inequality at the bottom of the distribution (Corneo et al., 2014). The relative importance of the main channels of the inequality increase has been assessed based on estimating counterfactual income distributions that hold some factors constant. The main factors found in this analysis are labor income inequality and changes in both employment outcomes and the tax system (Biewen and Juhasz, 2012).

3.2 Income Concept and Definition of Top Fractiles

This paper's mobility analysis is framed in terms of gross income, while the database reports taxable income. Mobility in taxable income does not necessarily coincide with mobility in gross income. Taxable income depends on the annual tax schedule whose changes might have different impacts on different tax units. I therefore construct a measure of economic gross income (EGI) from taxable income. Following Bach et al. (2013), I define EGI as gross income before taxes, including all observable tax-exempt income as well as transfers. Tax-exempt income includes all allowances, tax-exempt dividends,¹⁹ and a portion of pensions. Wage income includes the employees' social security contributions, but not the employers' contributions.²⁰ Realized capital gains, although partly included in the dataset, are excluded in the mobility analysis in section 4: the available data on capital gains include mainly capital gains due to retirement, that is, the sale or closure of a business. These capital gains are highly transitory, and they are observable in the cross-sectional tax data as such. The interesting information that panel data can provide is the evolution of incomes that are not obviously transitory. However, for the distributional analysis, I compare results including and excluding realized, documented capital gains, as capital gains reflect a considerable part of total income. In order to control for inflation, all income components are deflated to 2001 prices using the German consumer price index.²¹ Several issues cannot be addressed by this definition of gross income:

1. Capital income below the annual allowance cannot be included. As this paper deals with incomes at the top of the distribution, this should not seriously affect the results.
2. Unrealized capital gains, which would be a less transitory income component than realized capital gains, cannot be included. Imputed rents for homeowners cannot be taken into account either. Unrealized capital gains would most likely increase observed concentration. Imputed

¹⁹The data include two kinds of dividends. The first kind is reported as gross dividends before firm-level taxation. The second kind is reported as dividends net of firm-level taxation. I adjust the latter kind and include gross dividends before firm-level taxation in EGI.

²⁰For civil servants (Beamte), the employees' pension insurance payments are imputed. Civil servants receive a pension after retirement, but do not pay pension insurance during their working life. The insurance payment is thus not included in the reported gross wage.

²¹All federal statistics I use are provided by Destatis. For the consumer price index, see Destatis (2014a).

rents could be a more relevant income component in the middle of the income distribution.

3. The construction of gross income relies on taxable income. Thus, tax evasion and avoidance can be an issue:

- a) Gross income cannot be fully determined, and observed income concentration is thus biased. If relative risk aversion declines with income size, the top fractile members underreport more and observed income concentration is too low.²² To mitigate this bias, I correct gross income in cases of high negative incomes from renting and leasing: these losses can be offset against positive income from other sources and have been a predominant loophole. Therefore, I disregard losses above certain thresholds as they are likely to reflect tax planning rather than true income losses.²³
- b) The correlation of taxable income with true gross income is likely to be unstable over the data period because changes in tax law may have provoked behavioral responses. The two most important changes affected the top tax rate and the possibilities of loss deduction. Both may have induced taxable income responses. Changes in the top tax rate might be a driving factor for higher income concentration in years with low top tax rates.²⁴ Annual income mobility should not be affected as long as the taxable income elasticity depends monotonously on the income level. By contrast, income concentration is likely to be affected if the taxable income elasticity is not constant over all income levels. The annual bias depends on the direction of the policy change. Concentration in permanent incomes will be less affected, but the equalizing effect of permanent incomes in comparison to annual incomes will be overstated. Changes in loss deduction rules could result in lower income concentration in years with more generous deduction possibilities. In the first

²²Measurement error in gross income will have an impact on the movement of tax units between fractiles: on the one hand, some spurious movement will be observed, on the other hand, some true movements will not be observed. In general, the direction of the resulting bias is not clear. However, income shifting is likely to cause observed gross income to be more volatile than true gross income. Then, spurious movements are more likely than unobserved true movements if tax units differ in their shifting behaviour. In that case, mobility measurement will be biased upwards.

²³Losses from renting and leasing were used so extensively, that the reported taxable aggregate income from renting and leasing was negative throughout the nineties. In this analysis, I disregard losses from direct investments in real estate that exceed 5,000 € and losses from shareholdings that exceed 2,500 €. This method is in accordance with Bach et al. (2009), who also discuss the issue.

²⁴See section 3.1 for details of the tax schedule changes.

three years of the data period, accounting rules for the deduction of losses were more rigid than later on. Losses are likely to be distorted by tax avoidance and the change therein. This might lead to an overstatement of the mobility of high-income tax units.

Top income groups are defined with respect to the external population total of potential taxpayers.²⁵ The number of tax units that belong to each top income group is thus defined with respect to the aggregate population, not with respect to the sample population. Considered are the richest 10 %, 5 %, 1 %, 0.1 %, and 0.01 % fractiles. Note that the unit of analysis is the tax unit. Thus, the analysis mixes singles and couples, with different numbers of dependent children, without corrections for the household size.²⁶ Top income group members are defined as the N richest tax units in the database whose aggregated weight adds up to the respective number of potential taxpayers. As described in section 3.1 above, there is some panel attrition as the panel is balanced. However, attrition at the top does not seem to differ systematically across fractiles.²⁷ I therefore adjust panel weights for the portion of missing observations at the top, which can be derived from comparisons with annual statistics and cross-sectional micro data.²⁸

²⁵As tax data usually do not include the whole population, fractile sizes have to be determined using an external population total. This procedure was first used by Kuznets (1953). It was brought back to life by Piketty (2001, 2003) and has been widely used in subsequent research. Potential taxpayers are defined as all singles or married couples over the age of 20. The aggregate of potential taxpayers is computed on the basis of population statistics.

²⁶The unit of analysis differs across the pertinent literature and depends on the characteristics of the tax system. In general, the impact of the unit of analysis on assessed top income shares depends on the joint distribution of income over the spouses. Household and individual based series, however, empirically follow each other closely (Atkinson et al., 2011, pp. 15f.). In the German case, pooled income of spouses is less concentrated than individual income (Bach et al., 2009).

²⁷The attrition rate at the top is around 15 %. Adjusted panel weights are thus defined as panel weights divided by 0.85, assuming (i) that drop-out rates are comparable across top fractiles and years, and (ii) that panel attrition at the top is independent of income level. Comparisons with two additional data sources suggest that both assumptions are reasonable: (a) German tax statistics report the total number of taxpayers by gross taxable income (Gesamtbetrag der Einkünfte) which corresponds to the most comprehensive income measure of the tax statistic (Summe der Einkünfte), reduced by some allowances that are negligible for top incomes (Destatis, 2005–2011). In the highest reported income class, taxable incomes exceed 5 million €, which corresponds to incomes in the upper top 0.01 % of taxpayers. Figure A.2 in Appendix A compares the number of tax units in the annual statistics and in the weighted panel population (unadjusted panel weights) by income class. Usually, more than 80 % of the tax units from high income classes are included in the panel population. (b) A more detailed idea of the missing percentage inside the income fractiles can be obtained by cross-sectional micro data which is available for 2001 and 2004. The comparison is shown in Table A.1 in Appendix A.

²⁸Table A.3 in Appendix A reports the weighted (uncorrected panel weights and adjusted panel weights) and unweighted numbers of annual observations by fractile.

4 Mobility Analysis

4.1 Stability of Annual Top Income Groups

Three issues of top income mobility are related to this analysis: First, if the income elite is not stable, concentration is less problematic from a normative point of view. Second, if mobility has changed over time, the increase in top income shares that was found for many countries may have been offset by an increase in mobility. Third, if mobility is present, annual income concentration overstates permanent income concentration. Section 4 relates to the first two issues. The impact on income concentration will be addressed in section 5.

A frequent notion of top income mobility is the extent to which annual top income fractiles are stable in terms of member units. This mobility itself may have changed over time: then, the top fractiles' rising annual income shares may reflect rising income volatility rather than rising concentration in permanent incomes. This issue has been addressed in the literature by comparing the probability of remaining in a given fractile after a fixed period of time for different starting periods (Auten et al., 2013, Landais, 2008, Saez and Veall, 2005, 2007). For brevity, I will refer to this probability as persistence rate. Figure 1 shows persistence rates after one year and after three years for all top income fractiles starting with the top 5 %. Persistence rates after three years are not conditional on survival in the second year. After one year, the top 5 % and the top 1 % show stable persistence rates, whereas persistence in the top 0.1 % and in the top 0.01 % is lower in 2001 than in all other years. This might indicate responses to the 2001 tax reform. After three years, all fractiles show fairly stable persistence rates.

[place Figure 1 about here]

It is instructive to compare the German figures to Canadian, French, and US results. Canadian persistence rates have been assessed between 1982 and 2000 for various fractiles and three time lags. French persistence rates have been assessed between 1998 and 2004 for the top 0.1 %, also for three time lags. For the US, persistence in the top percentile has been analyzed between 1991 and 2009 for various time lags. Unlike the former analyses, persistence over two and more periods is defined conditional on survival in all years in between in the US case. All three

analyses find rather stable persistence rates over time (Auten et al., 2013, Landais, 2008, Saez and Veall, 2005, 2007).

For the top 0.1 % fractile, German persistence rates are around 70 % after one year for all years after 2001, and around 58 % after three years. For both time lags, the German figures exceed persistence in the Canadian top 0.1 %, which is roughly 60 % after one year and 40–50 % after three years (Saez and Veall, 2005, 2007).²⁹ French persistence rates in the top 0.1 % fractile are roughly 65–69 % after one year³⁰ and 40 % after three years (Landais, 2008). The French figures for the top 0.1 % after one year are thus similar to the German results. After three years, the German top 0.1 % are clearly less mobile than the French top 0.1 %. Persistence in the US top percentile after one year is typically 60–70 %, which is well below the corresponding German value of about 77 %.³¹ The German data thus show top income mobility of comparable magnitude to France after one year. For longer time lags and compared with the US and Canada, German figures show less mobility. German results confirm the previous findings that mobility between top fractiles is generally stable. This result strengthens the finding that income concentration increased in Germany since the 1990s (Bach et al., 2009, 2013, Bartels and Jenderny, 2014, Dell, 2011), as the increase in annual concentration does not seem to be offset by an increase in income mobility.

Both the persistence in top income groups and its change over time are mainly concerned with the reliability of annually measured top income shares and their evolution over time. However, a third, rather normative issue often arises within this analytical framework: the highest top income quantiles typically display greater downward mobility in the sense that persistence rates decrease in smaller top fractiles.³² This has been put in a normative context, implying that tax units at the top were especially prone to losing their relative position in later periods, and therefore annual

²⁹The Canadian persistence rate after two and three years is unconditional on fractile membership after one year and/or two years. Canadian figures for the top 5 % and the top 1 % are also lower than the German figures.

³⁰The last available figure for France, however, relates to the year 2004 and is lower than 65 %. It amounts to roughly 59 %.

³¹Results for longer time lags in the US analysis are also lower than German conditional figures. See Table A.4 in Appendix A for German conditional persistence after 2001. Figures for all years are available upon request.

³²This result is even more pronounced when persistence rates are conceived as conditional on continuous membership in the respective top fractiles, as in Auten et al. (2013). For a comparison of conditional and unconditional persistence rates in the TPP data, see Table A.4 in Appendix A.

income concentration did not matter in a normative way.³³ However, this interpretation does not take into account that persistence rates decrease mechanically towards the top because the fractile sizes decrease. Consider a random member of the annual 0.01 % and a random member of the annual 1 % of a given year. Suppose that both tax units suffer the same loss in income ranks. The tax unit in the annual 0.01 % is more likely to leave its fractile, because the group is smaller. Hence, a lower persistence rate in the topmost groups does not imply a higher mobility in terms of income ranks. It is therefore not suitable for any normative conclusions. In order to assess whether the members of the topmost groups move far away in terms of income ranks, I suggest two complementary analyses in section 4.2: I compare the downward mobility between top income groups of the same size, and I compare the volatility of individual annual ranks across top income groups.

4.2 Group Size Independent Mobility Comparisons

To judge whether the richest groups are more often subject to downward mobility, we have to compare their downward mobility with the downward mobility in lower income groups of comparable size. In Table 1, the top 1 %, the top 0.1 %, and the top 0.01 % fractiles are divided into deciles. The tenth decile of each fractile equals the whole next higher fractile. The first three columns refer to deciles of the annual fractiles 2001. They show the unconditional persistence rate above the same decile's threshold after 5 years, in 2006. In each of the three fractiles, members of the highest decile are less likely to move downwards than members of the lower deciles. The fourth, fifth, and sixth column of Table 1 show the same analysis for fractiles defined on three-year averages of EGI. They report the persistence rate above the decile threshold from the average income 2001–03 to the average income 2004–06. As in the annual case, the members of the richest deciles are less likely to move downwards than the remaining fractile members. If we take group sizes into account, the top of the distribution is thus clearly less mobile than comparable groups with lower incomes. Hence, annual changes of top income fractile members do not correspond to higher downward mobility at the top, but are a consequence of the small

³³Auten and Gee (2009) put their observations in the context of the Schumpeter hotel analogy, stating that in the US "the majority of the most luxurious rooms are occupied by different people at different times." (p.308).

sizes of the top fractiles.

[place Table 1 about here]

Rank statistics are a second mobility indicator that is independent of the fractile size. In the persistence analysis, the impact of a given rank change depends on the fractile size: at the very top, it might lead to mobility across several income fractile thresholds, whereas in a lower income range, it would not result in any fractile change. I therefore propose a measure of absolute rank changes to compare mobility across fractiles. For two points in time, the degree of rank changes for each tax unit could be measured by the coefficient of correlation between the two ranks. As the panel data provide six annual distributions, I assess the degree of rank changes for each tax unit using its individual standard deviation of annual ranks (*ir-std*):³⁴

$$(\textit{ir} - \textit{std})_i = \sqrt{\frac{\sum_{t=1}^6 (r_{i,t} - \bar{r}_i)^2}{5}}$$

For each tax unit, the standard deviation of its annual income ranks $r_{i,t}$ is constructed. Ranks are defined with respect to the annual panel population, using the panel weights. This standard deviation serves as an individual distance measure to describe the rank movement of a given individual. In contrast to transitions between fractiles, the *ir-std* does not depend on the fractile size and includes the rank changes over all six periods. Figure 2 shows the distribution of this measure of individual rank changes by top income fractile. Boxes show the P25, P50, and P75 percentile points of *ir-std* at a log scale. Whiskers correspond to the P5 and P95 percentile points. Black lozenges show the fractile size. White circles show the mean value of *ir-std*. Table 2 shows the corresponding figures. Fractiles are defined by permanent income over six years. While the mean of individual standard deviations does not show a clear trend in the three richest fractiles, P05, P25, P50, and P75 decline towards the top.

[place figure 2 about here]

³⁴In a two-period framework, the spearman correlation coefficient is widely used as a measure of rank correlation. D'Agostino and Dardanoni (2009) axiomatically derive a rank mobility index that provides a complete preorder of rank mobility between subgroups of a population. Their index coincides with the spearman correlation coefficient up to a monotonic transformation when applied to the whole population. In a two-period framework, the general form of their index would apply to the *ir-std* used in this paper. The *ir-std* would then measure the individual contribution to overall mobility.

[place Table 2 about here]

The ir-std of three thirds of the top 0.01 % did not exceed 8,470 ranks. The standard deviation of half of the top 0.01 % did not exceed 2,093 ranks, which is well below the fractile's size. The comparatively high mean value of the ir-std distribution is thus driven by few fractile members. Results are similar for the other top fractiles: P50 is clearly below the fractile's size for all reported top income groups. Hence, rank volatility clearly decreases with income and is low for the vast majority of tax units at the top.

Mobility between annual top income fractiles thus seems to be driven primarily by these groups' tiny sizes, where small rank changes can induce large mobility between the fractiles. If group size is eliminated as driving factor, members of top fractiles are less mobile in terms of income ranks than members of lower income fractiles. The observed inter fractile mobility hence reflects tiny group sizes rather than high turnover inside the income and power elite. However, looking at the annual share of top income quantiles might still be misleading because annual top fractiles do consist of different persons each year. How does the observed exchange between top income groups impact on top income shares?

5 Distribution Analysis

If tax units move between annual top income groups, annual income concentration is higher than concentration in permanent incomes over several years. This reduction in inequality with increasing time horizon was first analyzed by Shorrocks (1978) and has come to be known as the Shorrocks effect. If permanent income is seen as a more reliable welfare indicator than annual income, annual income concentration exaggerates the normatively relevant concentration. In this section, the distributional effects of using permanent income instead of annual income to derive top income shares are explored. Top income shares are measured for two conceptions of income: permanent income and annual income. Permanent income is defined as each tax unit's average income over six years. Permanent top income shares refer to fractiles defined on this permanent income. Annual top income shares are derived without using the panel structure and correspond to counter-factual concentration over six years if there had been no mobility: for each of the six

years, a cross-sectional analysis is conducted. Then, the resulting six measurements of a given fractile's threshold and mean income are averaged. According to this approach, a given tax unit may belong to different income fractiles in different years. The effect of income mobility is defined as the difference between average concentration in annual incomes and concentration in permanent incomes over the same period.³⁵

[place Table 3 about here]

Table 3 reports income thresholds, average incomes and income shares for the top income fractiles. Results for the annual income concept are compared to results for the permanent income concept. The first three columns refer to EGI without capital gains, the second three columns refer to EGI including capital gains.³⁶ In the first column, fractiles are defined on permanent income without capital gains. In the second column, fractiles are defined on annual income without capital gains. The third column shows the relative difference between the two concepts, in percent of the annual concept's result. The next three columns show the same results for EGI including capital gains. The first panel of Table 3 shows income thresholds for top income groups. The relative difference between the annual and the average income concept increases with income size, in both EGI conceptions (including and excluding capital gains). The top percentile's threshold income is hardly affected. Without capital gains, it decreases by 2.6 % when permanent income is used. The top 0.01 % fractile's threshold decreases by 9.2 %. When capital gains are included, the relative differences slightly decrease. The second and third panel of Table 3 show EGI means and top income shares for all fractiles. Top income shares refer to the average income aggregate of adjusted primary household income (PHI) between 2001 and 2006.³⁷ As the shares of both the average annual income concept and the permanent income

³⁵The absolute difference between the permanent and the average annual top income share corresponds to the top income mobility (TIM) curve as defined by Aaberge et al. (2013): for a given population share, the TIM curve measures the difference between the Lorenz curve defined on permanent income and the average of annual Lorenz curves, weighted by annual mean income, in the same period.

³⁶Note that realized capital gains were excluded in the mobility analysis of the previous sections, as they are a volatile income component that can be corrected for in annual data. The distributional analysis in this chapter reports results for EGI including and excluding realized capital gains, as far as they can be reconstructed from the database. For details on reported and not reported realized capital gains, see footnote 17. For convenience, I will refer to realized taxable capital gains as capital gains.

³⁷PHI as reported in German national accounts (Destatis, 2014c), net of employers' SSC and including monetary social transfers to match the EGI definition in section 3.2. Note that this income total includes monetary social

concept share the same denominator, the relative reduction in mean incomes corresponds to the relative reduction in top income shares. The equalizing effect on top income shares is moderate in size. Without capital gains, using the permanent income concept decreases the income share of the top 1 % by 4.9 %. The share of the top 0.01 % decreases by 10.8 %. Hence, even in the topmost fractile about 90 % of cross-sectional concentration persists in permanent income over six years. When capital gains are included, the relative differences increase to 5.3 % for the top 1 % and 13.8 % for the top 0.01 %.³⁸

[place Figure 3 about here]

To compare the equalizing effect for different period lengths and across time, the same analysis was conducted for rolling three-year subperiods (2001/03, 2002/04, 2003/05, and 2004/06). Figure 3 shows the top fractiles' income shares for several periods. Again, results are reported for EGI including (right) and excluding (left) capital gains. In each of the two panels, the first category shows concentration in permanent income over six years. The other categories show annual concentration and permanent concentration in rolling 3-year subperiods. Annual concentration is generally stable with a slight increase in 2005 and 2006. This increase may reflect responses to tax policies, as in 2005 and 2006 the marginal top tax rate was the lowest throughout the decade.³⁹ Concentration of rolling three-year subperiods almost perfectly coincides with annual concentration, for EGI including and excluding capital gains. For the top percentile, the share is reduced by about 3 %.⁴⁰ Permanent top income shares over three years have also been derived for Norway between 1969 and 2011 and Canada between 1982 and 2000 (Aaberge et al., 2013, Saez and Veall, 2005, 2007). For both countries, permanent top income shares cor-

transfers (mostly pensions). It therefore exceeds the external total used by Dell (2007). Adjusted PHI is close to the income total that Bach et al. (2013) derive using an integrated database that includes households that do not file income tax returns.

³⁸Bach et al. (2013) use a similar income concept and find similar figures (for the years 2001, 2004, and 2005 their results (Table A3) can be compared to this paper's annual results including capital gains in the Appendix Table B.1). Findings differ the strongest for the top 10 %. Here, Bach et al. (2013) find consistently higher thresholds (about 70,000€ including capital gains) and average incomes (at least 115,000€). These differences are most likely due to the restriction of the TPP data on tax filers, while Bach et al. (2013) use an integrated database that is matched with survey data and thus better represents wage earners. For further details on the panel population see section 3.1 and Appendix A.

³⁹See section 3.1 for details on the top marginal tax rate over the data period.

⁴⁰Detailed results for subperiods are shown in Tables B.2 and B.3 in Appendix B.

respond closely to annual shares. For Norway, also the corresponding average annual shares are available. The comparison of the German and the Norwegian equalizing effects is, however, complicated by two issues: first, during the period analyzed in this paper, two Norwegian tax reforms had a substantial impact on annual income concentration and hence on the equalizing effect. Second, it is a matter of debate whether the relative reduction in top income shares due to mobility should be compared across countries: if cross-sectional inequality is low, small changes in relative incomes lead to large relative reductions in top income shares. (Aaberge and Mogstad, 2014). Aaberge et al. (2013) therefore propose the absolute reduction in top income shares (TIM curve) as a measure for the equalization of permanent income.⁴¹ I compared German and Norwegian equalizing effects both using the TIM curve and in relative terms.⁴² German mobility in the years 2001–2006 is fairly low compared with Norwegian mobility during the same period in both mobility concepts. It is, however, more comparable to Norwegian figures in earlier decades. The distribution analysis thus confirmed Canadian and Norwegian results that permanent income concentration closely corresponds to annual concentration. Quantitative comparisons of the equalizing effect are not straightforward, but suggest that the Norwegian equalizing effect exceeds the German effect.

6 Conclusion

In this paper, income mobility among top income recipients and its effect on income concentration in Germany was analyzed. A comprehensive gross income measure (EGI) was constructed from panel data of income tax files on the micro level. The extent of income mobility was analyzed with respect to three dimensions: (i) persistence in annual top income fractiles and its development over time, (ii) mobility measures that do not depend on the fractiles' sizes: persistence in equally-sized groups and the scale of annual rank changes, and (iii) the impact of top

⁴¹The TIM curve gives a better idea of how strong the equalizing effect is in relation to the external income total. When top income shares are compared across countries, it is hence suitable as corresponding measure of top income mobility. In turn, the TIM curve depends on the definition the external income total. Like top income shares, it is thus sensitive to conceptual differences in gross income, such as the inclusion of capital gains or monetary transfers.

⁴²Results are reported in the Appendix Table A.5.

income mobility on income concentration as measured by top income shares.

(i) Persistence rates after one and after three years in top income fractiles are in general somewhat higher than Canadian, French, and US results. After one year, German persistence rates are of comparable magnitude to those observed in France for the top 0.1 %. Persistence is fairly stable across the observed period. Hence, rising income concentration thus does not seem to be offset by an increase in income mobility.

(ii) In order to compare downward mobility across the distribution, persistence was assessed for deciles of the top income fractiles. It was shown that the high annual turnover in the topmost fractiles is driven by the tiny group sizes. Given the group size, members of the top fractiles are less downward mobile than less rich units. The persistence analysis was complemented by rank analysis. For each tax unit, the standard deviation of its individual annual ranks (ir-std) was computed as an individual distance measure of the changes between the six annual ranks. The distribution of ir-std was then evaluated by income fractile. The bulk of the top income fractiles' members have fairly stable ranks across the years. At least half of the members of each top income group show standard deviations of individual ranks that are below the group's size. The median fractile member in terms of rank mobility thus never moves far away, even if the fractile threshold is crossed.

(iii) The distributional impact of top income mobility was assessed by comparing annual and permanent income concentration. The effect of income mobility on income concentration was measured by the relative reduction in top income shares when shares are assessed on permanent income, compared with averaged annual results over the same period. The analysis was conducted for rolling three-year periods and for the whole data period of six years. Results were presented for EGI including and excluding capital gains. In general, cross-sectional concentration and permanent concentration closely correspond. Over the six-year period, the share of the top 0.01 % decreases by 10.8 % in the series without capital gains. In contrast, for the top 1 % the effect does not exceed 5 %. The impact of mobility on income concentration is thus moderate and driven by the topmost fractile groups.

The increase in income concentration since the 1990s documented in the literature (Bach et al., 2009, 2013, Bartels and Jenderny, 2014, Dell, 2011) is thus unlikely to be offset by high or even

rising income mobility. Instead, it most likely reflects a true rise in the income share of the top income groups, which may impact on society in several ways. The rise in inequality contrasts with preferences for an equal income distribution. If high incomes come along with political power, this power is likely to increase. Finally, a rise in the income share at the top reduces the benefits of economic growth to the remaining population. Taxation of income and wealth at the top is likely to be a driving factor of income concentration. Since German top tax rates are low compared with the late 1990s and the wealth tax was abolished, German income concentration may well keep rising. Its impacts on society may therefore gain urgency in the future.

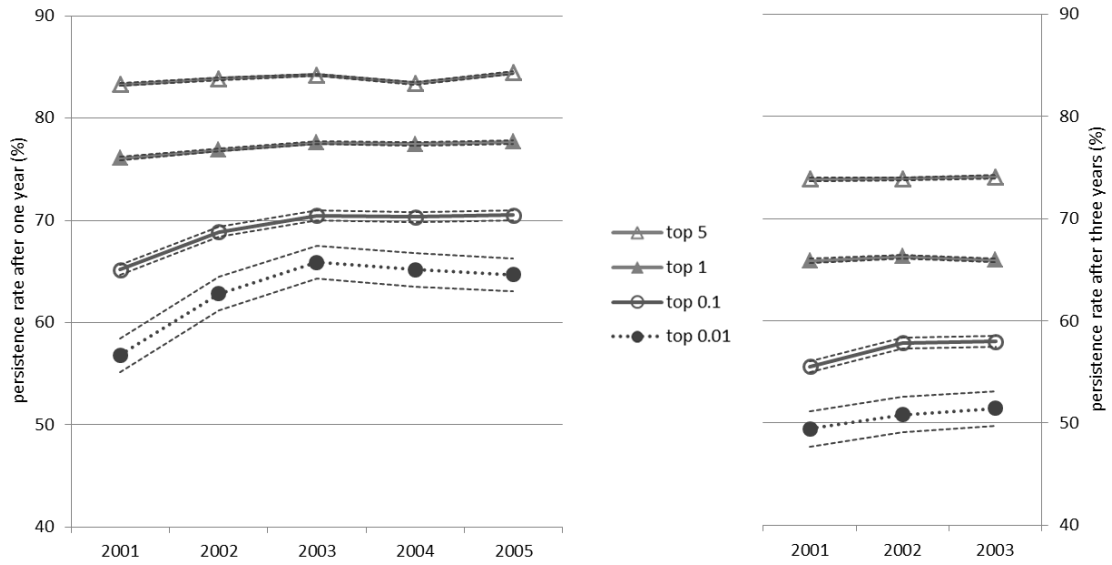


Figure 1: Persistence rate in fractile after 1 year (left) and three years^a (right)

Notes: ^a The persistence rate after three years is unconditional on fractile membership after one year and two years. Conditioning reduces the probability to between 44.5% and 47.8% for the top 0.1%. Thin scattered lines show 95% confidence intervals (analytic).

Source: Own computation based on TPP 2001–2006.

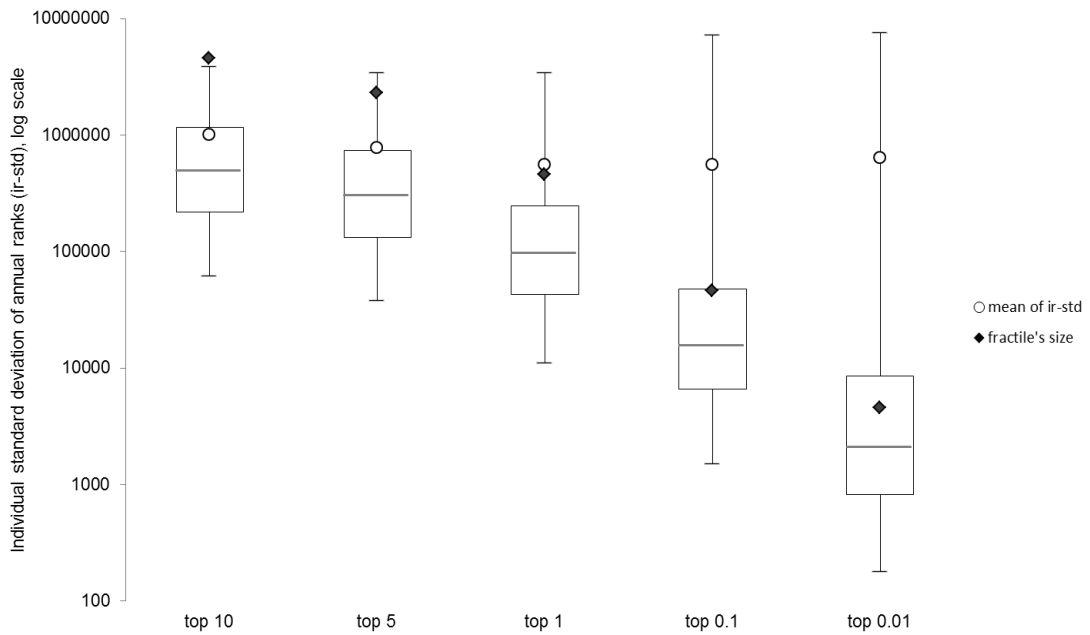


Figure 2: Distribution of standard deviations of individual annual ranks by top fractile

Notes: Boxes correspond to P25, P50, and P75 percentile points of individual standard deviations of annual ranks (ir-std). Whiskers correspond to P5 and P95 percentile points. Fractiles defined by permanent EGI over six years. See Table 2 for values.

Source: TPP 2001–2006

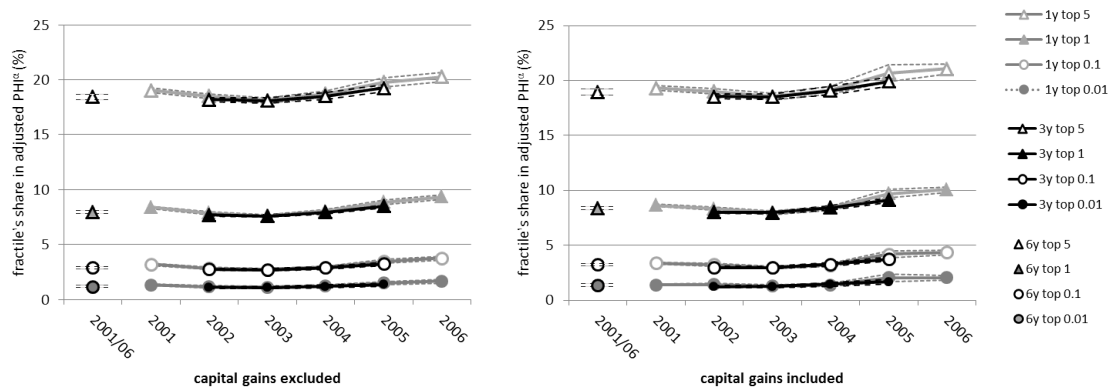


Figure 3: Comparison of concentration between subperiods of different length

Notes: ^a Adjusted PHI: primary household income as reported in German national accounts, net of employers' SSC and including monetary social transfers. 1y: annual EGI; 3y: average EGI over 3 years; 6y: average EGI over 6 years. Thin scattered lines show 95 % confidence intervals. See Tables 3, B.1, B.2, and B.3 for values.

Source: Own computation based on TPP 2001–2006, German consumer price index, German national accounts (Destatis, 2014a,c).

Table 1: Downward mobility assessed on equally-sized groups

| deciles of fractiles ^a | % of decile members who do not move downwards | | | | | |
|--------------------------------------|---|------------|------------|--------------------------------------|------------|------------|
| | annual 2001 – 2006 | | | 3 year averages 2001/03 – 2004/06 | | |
| | top 1 | top 0.1 | top 0.01 | top 1 | top 0.1 | top 0.01 |
| 1 | 33.6 (1.0) | 28.4 (0.9) | 22.6 (2.5) | 40.0 (1.1) | 37.4 (0.9) | 28.8 (2.7) |
| 2 | 33.4 (0.8) | 26.7 (0.9) | 24.3 (2.6) | 42.4 (0.8) | 35.4 (0.9) | 30.4 (2.7) |
| 3 | 33.1 (0.6) | 28.2 (0.9) | 19.6 (2.4) | 43.6 (0.6) | 36.7 (0.9) | 29.5 (2.7) |
| 4 | 33.8 (0.5) | 27.1 (0.8) | 24.1 (2.6) | 43.0 (0.5) | 34.4 (0.9) | 34.3 (2.8) |
| 5 | 34.0 (0.5) | 27.9 (0.9) | 26.2 (2.6) | 42.9 (0.4) | 36.6 (0.9) | 30.4 (2.7) |
| 6 | 33.8 (0.4) | 29.0 (0.9) | 31.0 (2.8) | 44.8 (0.4) | 37.8 (0.9) | 34.6 (2.8) |
| 7 | 34.4 (0.4) | 27.3 (0.8) | 27.7 (2.7) | 45.3 (0.3) | 38.1 (0.9) | 39.5 (2.9) |
| 8 | 35.6 (0.3) | 29.8 (0.9) | 27.7 (2.7) | 46.7 (0.3) | 40.3 (0.9) | 41.6 (2.9) |
| 9 | 38.8 (0.3) | 31.8 (0.9) | 28.3 (2.7) | 51.9 (0.3) | 45.0 (0.9) | 45.2 (3.0) |
| 10 | 49.0 (0.3) | 43.5 (0.9) | 43.1 (3.0) | 64.9 (0.3) | 60.2 (0.9) | 59.6 (2.9) |
| | size of decile | | | size of decile | | |
| N min ^b | 9,757 | 3,217 | 332 | 8,609 | 3,260 | 332 |
| N max ^b | 32,778 | 3,321 | 333 | 33,055 | 3,321 | 333 |
| sumwgt ^c | 46,000 | 4,600 | 460 | 46,000 | 4,600 | 460 |

Notes: ^a Deciles of the respective top income group members, defined by the indicated income definition. Standard errors (analytic) in parenthesis. ^b Unweighted/ ^c Weighted observations (adjusted panel weights) in decile of start-year fractile. As weights differ across tax units, unweighted decile sizes may differ.

Source: Own computation based on TPP 2001–2006.

Table 2: Distribution of ir-std by fractile

| | top 10 ^b | top 5 ^b | top 1 ^b | top 0.1 ^b | top 0.01 ^b |
|--------|----------------------|--------------------|--------------------|----------------------|-----------------------|
| P95 | 3,889,469 | 3,405,740 | 3,446,615 | 7,231,711 | 7,580,387 |
| P75 | 1,165,594 | 731,672 | 244,505 | 47,766 | 8,470 |
| P50 | 498,494 | 302,616 | 97,223 | 15,667 | 2,093 |
| P25 | 217,042 | 132,081 | 42,629 | 6,546 | 823 |
| P05 | 61,430 | 37,961 | 11,024 | 1,510 | 179 |
| mean | 1,007,776 (6,735) | 778,488 (5,741) | 557,304 (3,825) | 557,526 (11,194) | 644,979 (39,751) |
| N | 409,389 | 335,223 | 250,192 | 33,071 | 3,320 |
| sumwgt | 4,600,000 | 2,300,000 | 460,000 | 46,000 | 4,600 |

Notes: ^aIndividual standard deviation of annual ranks ^bFractiles defined by average EGI over six years. Fractiles are defined as to include all richer tax units. Standard error of mean (analytic) in parenthesis.

Source: Own computation based on TPP 2001–2006.

Table 3: Distributional results 2001–2006

| Lowest EGI in Fractile ^a (1000 € in 2001 prices) | | | | | | |
|---|------------------------|---------------------|---------------------|-------------------------------------|---------------------|---------------------|
| fractile ^c | capital gains excluded | | | capital gains included ^b | | |
| | permanent ^d | annual ^e | % diff ^f | permanent ^d | annual ^e | % diff ^f |
| top 10 | 58 | 58 | 1.1 | 58 | 58 | 1.0 |
| top 5 | 75 | 77 | 1.5 | 76 | 77 | 1.4 |
| top 1 | 137 | 141 | 2.6 | 139 | 142 | 2.4 |
| top 0.1 | 422 | 440 | 4.2 | 442 | 458 | 3.5 |
| top 0.01 | 1641 | 1807 | 9.2 | 1829 | 2009 | 8.9 |

| Average EGI (1000 € in 2001 Prices) | | | | | | | | | | |
|-------------------------------------|------------------------|---------------------|---------------------|-------------------------------------|---------------------|---------------------|-------|-------|-------|------|
| fractile ^c | capital gains excluded | | | capital gains included ^b | | | | | | |
| | permanent ^d | annual ^e | % diff ^f | permanent ^d | annual ^e | % diff ^f | | | | |
| top 10 | 99 | (1) | 102 | (0) | 2.6 | 101 | (1) | 104 | (0) | 2.7 |
| top 5 | 133 | (1) | 138 | (0) | 3.3 | 137 | (1) | 142 | (1) | 3.4 |
| top 1 | 287 | (2) | 302 | (1) | 4.9 | 303 | (3) | 320 | (2) | 5.3 |
| top 0.1 | 1,053 | (21) | 1,142 | (9) | 7.8 | 1,172 | (24) | 1,287 | (13) | 8.9 |
| top 0.01 | 4,299 | (198) | 4,818 | (90) | 10.8 | 5,024 | (225) | 5,826 | (121) | 13.8 |

| EGI Shares (% of Adjusted Primary Household Income ^g) | | | | | | | | | | |
|---|------------------------|---------------------|---------------------|-------------------------------------|---------------------|---------------------|--------|-------|--------|------|
| fractile ^c | capital gains excluded | | | capital gains included ^b | | | | | | |
| | permanent ^d | annual ^e | % diff ^f | permanent ^d | annual ^e | % diff ^f | | | | |
| top 10 | 27.49 | (0.17) | 28.23 | (0.08) | 2.6 | 28.02 | (0.19) | 28.80 | (0.10) | 2.7 |
| top 5 | 18.45 | (0.13) | 19.07 | (0.06) | 3.3 | 18.95 | (0.15) | 19.62 | (0.08) | 3.4 |
| top 1 | 7.94 | (0.07) | 8.35 | (0.03) | 4.9 | 8.39 | (0.08) | 8.86 | (0.04) | 5.3 |
| top 0.1 | 2.91 | (0.06) | 3.16 | (0.03) | 7.8 | 3.24 | (0.07) | 3.56 | (0.04) | 8.9 |
| top 0.01 | 1.19 | (0.05) | 1.33 | (0.02) | 10.8 | 1.39 | (0.06) | 1.61 | (0.03) | 13.8 |

Notes: ^aAverage of three (unweighted) lowest observations in fractile due to data anonymization. ^bRealized reported capital gains (see footnote 17) ^cFractiles are defined by the reported income concept ^dEach tax unit's permanent income 2001–2006 ^eAverage value for six annual results. See Appendix B for annual results. ^fDifference between annual and permanent result (%), percentage defined with respect to averaged annual results. ^gAdjusted PHI: primary household income as reported in German national accounts, net of employers' SSC and including monetary social transfers.

Source: Own computation based on TPP 2001–2006, German consumer price index, German national accounts (Destatis, 2014a,c).

References

- Aaberge, R., A. B. Atkinson, and J. Modalski (2013). *The Ins and Outs of Top Income Mobility*. Discussion Paper 7729. IZA.
- Aaberge, R. and M. Mogstad (2014). *Income Mobility as an Equalizer of Permanent Income*. Discussion Paper 769. Research Department of Statistics Norway.
- Alesina, A. F. and P. Giuliano (2009). *Preferences for Redistribution*. NBER Working Paper Series 14825.
- Alvaredo, F. et al. (2013). The Top 1 Percent in International and Historical Perspective. *Journal of Economic Perspectives* 27 (3), pp. 1–21.
- (2014). *The World Top Incomes Database*. 01/06/2014. URL: <http://g-mond.parisschoolofeconomics.eu/topincomes>.
- Atkinson, A. B. (2007). The Distribution of Top Incomes in the United Kingdom 1908-2000. In: *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press, pp. 82–140.
- Atkinson, A. B., F. Bourguignon, and C. Morrisson (1992). *Empirical Studies of Earnings Mobility*. Fundamentals of Pure and Applied Economics 52. Harwood Academic Publishers, Chur.
- Atkinson, A. B. and T. Piketty, eds. (2007). *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Oxford University Press.
- eds. (2010). *Top incomes: a global perspective*. Oxford University Press.
- Atkinson, A. B., T. Piketty, and E. Saez (2011). Top Incomes in the Long Run of History. *Journal of Economic Literature* 49 (1), pp. 3–71.
- Atkinson, A. B. and W. Salverda (2005). Top Incomes in the Netherlands and the United Kingdom over the 20th Century. *Journal of the European Economic Association* 3 (4), pp. 883–913.
- Atkinson, A. B. and W. Salverda (2007). Top Incomes in the Netherlands over the 20th Century. In: *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and*

- English-Speaking Countries*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press, pp. 43–81.
- Atkinson, A. B. and S. Voitchovsky (2011). The Distribution of Top Earnings in the UK since the Second World War. *Economica* 78 (311), pp. 440–459.
- Auten, G. and G. Gee (2009). Income Mobility in the United States: New Evidence from Tax Return Data. *National Tax Journal* 62 (2), pp. 301–328.
- Auten, G., G. Gee, and N. Turner (2013). Perspectives on Inequality and Mobility in the US: Income Inequality, Mobility, and Turnover at the Top in the US, 1987-2010. *American Economic Review: Papers and Proceedings* 103 (3), pp. 168–172.
- Bach, S., G. Corneo, and V. Steiner (2009). From Bottom to Top: The Entire Income Distribution in Germany, 1992-2003. *Review of Income and Wealth* 55 (2), pp. 303–330.
- (2013). Effective Taxation of Top Incomes in Germany. *German Economic Review* 14 (2), pp. 115–137.
- Bartels, C. and K. Jenderny (2014). *The Role of Capital Income for Top Income Shares in Germany*. Discussion Paper 2014/32. FU Berlin, School of Business and Economics.
- Besley, T. and A. Prat (2006). Handcuffs for the Grabbing Hand? Media Capture and Government Accountability. *American Economic Review* 96 (3), pp. 720–736.
- Biewen, M. and A. Juhasz (2012). Understanding Rising Income Inequality in Germany, 1999/2000-2005/2006. *Review of Income and Wealth* 58 (4), pp. 622–647.
- Björklund, A., J. Roine, and D. Waldenström (2012). Intergenerational Top Income Mobility in Sweden: Capitalist Dynasties in the Land of Equal Opportunity? *Journal of Public Economics* 96 (5-6), pp. 474–484.
- Black, S. E. and P. J. Devereux (2011). Recent Developments in Intergenerational Mobility. In: *Handbook of Labor Economics*. Ed. by O. Ashenfelter and D. Card. Vol. 4. Elsevier, pp. 1487–1541.
- Burkhauser, R. V. and K. A. Couch (2011). Intragenerational Inequality and Intertemporal Mobility. In: *The Oxford Handbook of Economic Inequality*. Ed. by W. Salverda, B. Nolan, and T. M. Smeeding. Oxford University Press, pp. 522–545.

- Corneo, G. (2006). Media Capture in a Democracy: The Role of Wealth Concentration. *Journal of Public Economics* 90 (1-2), pp. 37–58.
- Corneo, G., S. Zmerli, and R. Pollak (2014). Rising Inequality and the Transformation of Rhine Capitalism. In: *Changing Inequalities and Societal Impacts in Rich Countries. Thirty Countries' Experiences*. Ed. by B. Nolan et al. Oxford University Press, pp. 271–298.
- D'Agostino, M. and V. Dardanoni (2009). The Measurement of Rank Mobility. *Journal of Economic Theory* 144 (4), pp. 1783–1803.
- Dell, F. (2005). Top Incomes in Germany and Switzerland Over the Twentieth Century. *Journal of the European Economic Association* 3 (2–3), pp. 412–421.
- (2007). Top Incomes in Germany Throughout the Twentieth Century 1891-1998. In: *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press, pp. 365–425.
- (2011). *Update and Extension of Germany Series*. Methodological Note. The World Top Incomes Database.
- Destatis (2005–2011). *Jährliche Einkommensteuerstatistik*. Finanzen und Steuern – Fachserie 14 Reihe 7.1.1 – 2001–2006. Destatis, Wiesbaden.
- (2014a). *Preise. Verbraucherpreisindizes für Deutschland. Lange Reihen ab 1948*. Destatis, Wiesbaden.
- (2014b). *Volkswirtschaftliche Gesamtrechnungen. Inlandsproduktsberechnung, Lange Reihen ab 1970*. Volkswirtschaftliche Gesamtrechnungen – Fachserie 18 Reihe 1.5 – 2013. Destatis, Wiesbaden.
- (2014c). *Volkswirtschaftliche Gesamtrechnungen. Sektorkonten, Jahresergebnisse ab 1991*. Destatis, Wiesbaden.
- Fields, G. S. and E. A. Ok (1999). The Measurement of Income Mobility: An Introduction to the Literature. In: *Handbook on Income Inequality Measurement*. Ed. by J. Silber. Kluwer Academic Publishers, Boston, pp. 557–598.
- Jäntti, M. and S. P. Jenkins (forthcoming). Income Mobility. In: *Handbook of Income Distribution, vol. 2*. Ed. by A. B. Atkinson and F. Bourguignon. North-Holland, Amsterdam.

- Jenkins, S. P. (2011). *Changing Fortunes: Income Mobility and Poverty Dynamics in Britain*. Oxford University Press.
- Kuznets, S. (1953). *Shares of Upper Income Groups in Income and Savings*. NBER.
- Landais, C. (2007). *Les Hauts Revenus en France 1998-2006: Une Explosion des Inégalités?* mimeo, PSE.
- (2008). *Top Incomes in France: booming inequalities?* mimeo, PSE.
- Lee, C.-I. and G. Solon (2009). Trends in Intergenerational Income Mobility. *The Review of Economics and Statistics* 91 (4), pp. 766–772.
- Matthews, S. (2011). *Trends in Top Incomes and their Tax Policy Implications*. OECD Taxation Working Papers 4.
- Merz, J. and M. Zwick (2008). *Einkommens- und Verteilungsanalysen mit dem Taxpayer-Panel - neue Möglichkeiten und erste Ergebnisse für Selbständige als Freiberufler und Unternehmer und abhängig Beschäftigte sowie hohe Einkommen*. FBB-Diskussionspapier 74. Forschungsinstitut Freie Berufe, Lüneburg.
- OECD (2011). *Divided We Stand: Why Inequality Keeps Rising*. OECD Publishing.
- Piketty, T. (2001). *Les hauts revenus en France au XX^e siècle: Inégalités et redistributions, 1901-1998*. Grasset.
- (2003). Income Inequality in France, 1901-1998. *Journal of Political Economy* 111 (5), pp. 1004–1042.
- (2007). Income, Wage, and Wealth Inequality in France, 1901-1998. In: *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press, pp. 43–81.
- Piketty, T. and E. Saez (2003). Income Inequality in the United States, 1913-1998. *The Quarterly Journal of Economics* 118 (1), pp. 1–39.
- (2007). Income and Wage Inequality in the United States, 1913-2002. In: *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press, pp. 141–225.
- Roine, J. and D. Waldenström (2008). The evolution of top incomes in an egalitarian society: Sweden, 1903-2004. *Journal of Public Economics* 92 (1-2), pp. 366–387.

- Roine, J. and D. Waldenström (2010). Top Incomes in Sweden over the Twentieth Century. In: *Top incomes: a global perspective*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press, pp. 299–370.
- (2012). On the Role of Capital Gains in Swedish Income Inequality. *Review of Income and Wealth* 58 (3), pp. 569–587.
- (forthcoming). Long Run Trends in the Distribution of Income and Wealth. In: *Handbook of Income Distribution, vol. 2*. Ed. by A. B. Atkinson and F. Bourguignon. North-Holland, Amsterdam.
- Rosen, S. (1981). The Economics of Superstars. *American Economic Review* 71 (5), pp. 845–858.
- Saez, E. (2013). *Striking it Richer: The Evolution of Top Incomes in the United States (Updated with 2012 preliminary estimates)*. Methodological Note. The World Top Incomes Database.
- Saez, E. and M. R. Veall (2005). The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence. *American Economic Review* 95 (3), pp. 831–849.
- (2007). The Evolution of High Incomes in Canada, 1920–2000. In: *Top Incomes Over the Twentieth Century: A Contrast Between Continental European and English-Speaking Countries*. Ed. by A. B. Atkinson and T. Piketty. Oxford University Press.
- Salverda, W. (2013). *Extending the top-income shares for the Netherlands from 1999 to 2012: An explanatory note*. Methodological Note. The World Top Incomes Database.
- Shorrocks, A. (1978). Income Inequality and Income Mobility. *Journal of Economic Theory* 19, pp. 376–393.
- Solon, G. (1992). Intergenerational Income Mobility in the United States. *American Economic Review* 82 (3), pp. 393–408.
- Yitzhaki, S. (1979). Relative Deprivation and the Gini Coefficient. *The Quarterly Journal of Economics* 93 (2), pp. 321–324.

Appendix A Observation Numbers and Comparisons

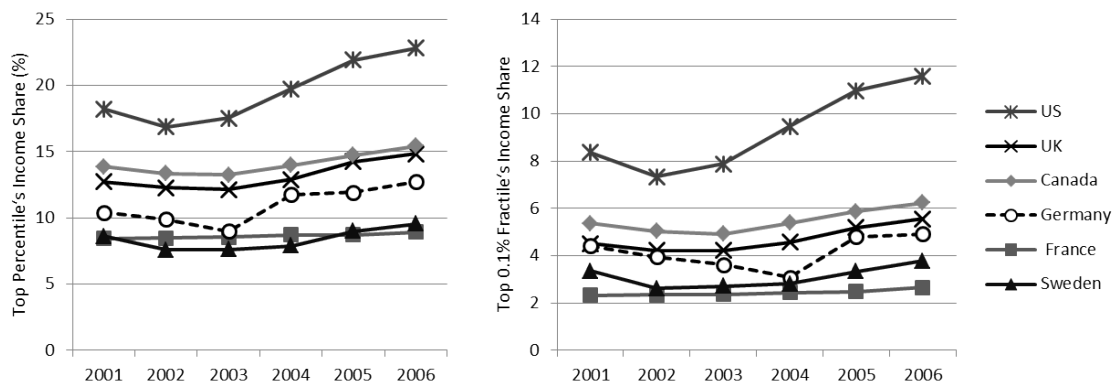


Figure A.1: Top income shares in selected countries (WTID)

Notes: Income / population definitions: US: tax units, total income including capital gains. UK: adults, total income. Canada: tax units, total income excluding capital gains, LAD-Longitudinal Administrative Database. Germany: tax units, total income including taxable capital gains. France: tax units, total income excluding capital gains, tax return data. Sweden: tax units, total income excluding capital gains.
Source: World Top Incomes Database (Alvaredo et al. (2014), including data from various countries (Atkinson, 2007, Dell, 2007, 2011, Landais, 2007, Piketty, 2007, Piketty and Saez, 2007, Roine and Waldenström, 2010, Saez and Veall, 2007)).

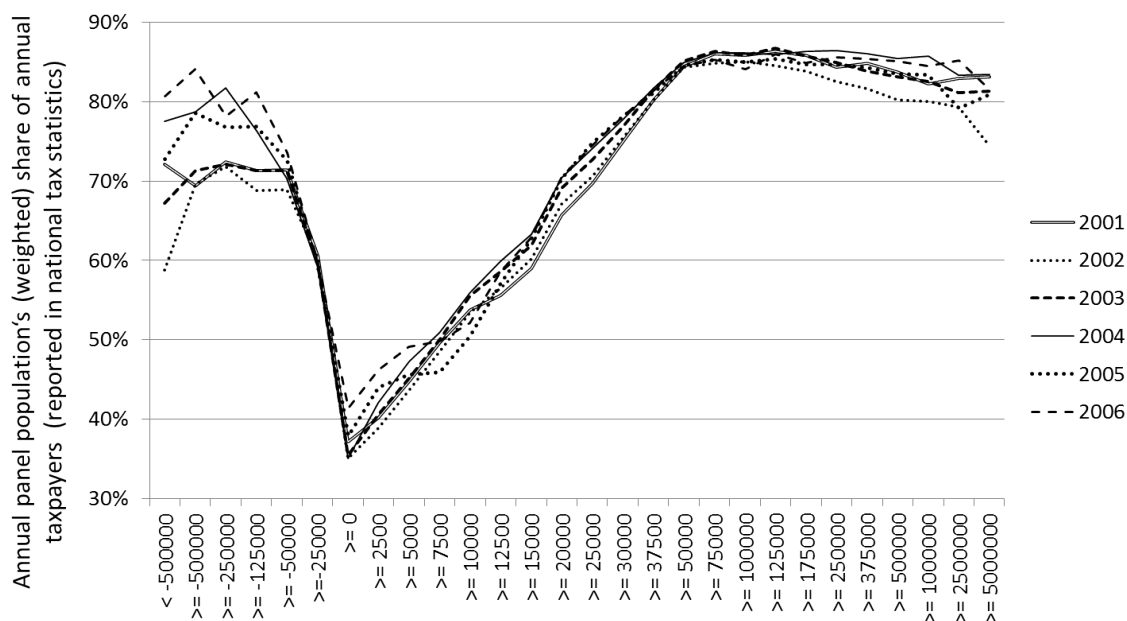


Figure A.2: Comparison: panel data with annual tax statistics

Notes: TPP filers as % of all annual income tax filers as reported in national tax statistics, by classes of gross taxable income (Gesamtbetrag der Einkünfte).
Source: Own computation based on TPP 2001–2006, Destatis (2005–2011).

Table A.1: Comparison: panel data with annual micro data

| fractile | number of households ^a | | | mean income (1000 €) | | |
|-------------|-----------------------------------|-------------------|-----------|----------------------|-------------------|-------|
| | TPP ^b | FAST ^c | % missing | TPP ^b | FAST ^c | %diff |
| 2001 | | | | | | |
| P90–95 | 2,299,979 | 2,740,492 | 16.1 | 56 | 56 | -0.1 |
| P95–99 | 1,839,988 | 2,130,517 | 13.6 | 83 | 83 | 0.0 |
| P99–99.9 | 413,999 | 483,699 | 14.4 | 180 | 180 | 0.1 |
| P99.9–99.99 | 41,400 | 49,021 | 15.5 | 672 | 675 | 0.4 |
| P99.99–100 | 4,599 | 5,537 | 17.2 | 4,407 | 4,369 | -0.9 |
| 2004 | | | | | | |
| P90–95 | 2,300,006 | 2,845,361 | 19.2 | 57 | 57 | -0.1 |
| P95–99 | 1,839,980 | 2,193,154 | 16.1 | 86 | 86 | -0.1 |
| P99–99.9 | 413,993 | 486,828 | 15.0 | 182 | 182 | -0.1 |
| P99.9–99.99 | 41,400 | 48,446 | 14.5 | 604 | 603 | -0.1 |
| P99.99–100 | 4,600 | 5,437 | 14.8 | 3,869 | 3,954 | 2.1 |

Notes: ^aWeighted number of households who by their gross taxable income (GDE) belong to the fractile as defined on panel data (panel weights, not adjusted). ^bTaxpayer panel 2001–2006, dataset used in this paper's analysis. ^cAnnual microdata (scientific use files 2001 & 2004, 10 % stratified samples of triannual tax statistics, Faktisch Anonymisierte Lohn- und Einkommensteuerstatistik) Source: Own computation based on TPP 2001–2006 and scientific-use files FAST 2001, 2004.

Table A.2: Income aggregates

| | income aggregates (billion €, 2001 prices) | | | | | |
|-----------------------------------|--|-------|-------|-------|-------|-------|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
| GNP ^a | 2,158 | 2,151 | 2,145 | 2,194 | 2,193 | 2,267 |
| PHI ^b | 1,587 | 1,559 | 1,571 | 1,558 | 1,558 | 1,591 |
| PHI _{Adj} ^c | 1,674 | 1,654 | 1,669 | 1,655 | 1,649 | 1,670 |
| EGI ^d | 850 | 842 | 839 | 843 | 867 | 878 |
| % | 50.8 | 50.9 | 50.3 | 50.9 | 52.6 | 52.6 |
| GTI _{Agg} ^e | 959 | 940 | 912 | 908 | 933 | 938 |
| GTI _{Panel} ^f | 744 | 738 | 738 | 755 | 784 | 803 |
| % | 77.5 | 78.5 | 81.0 | 83.2 | 84.0 | 85.6 |

Notes: ^aGross national product ^bPrimary household income ^cAdjusted primary household income: net of employers' SSC, including monetary social transfers ^dEconomic gross income in dataset used in this paper (unadjusted panel weights, capital gains excluded) ^eGross taxable income (Gesamtbetrag der Einkünfte) in annual tax statistics / ^fin dataset. Source: Own computation based on TPP 2001–2006, Destatis (2005–2011, 2014a,b,c).

Table A.3: Numbers of observations

| | unweighted observations | | | | | |
|-------------|--|-----------|-----------|-----------|-----------|-----------|
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
| P90–95 | 71,248 | 70,705 | 71,213 | 71,928 | 73,430 | 74,163 |
| P95–99 | 109,993 | 101,159 | 97,787 | 95,155 | 99,193 | 105,779 |
| P99–99.9 | 185,045 | 192,139 | 196,229 | 200,781 | 198,781 | 192,262 |
| P99.9–99.99 | 29,457 | 29,326 | 29,490 | 29,420 | 29,625 | 29,465 |
| P99.99–100 | 3,321 | 3,321 | 3,321 | 3,321 | 3,321 | 3,301 |
| all | 928,993 | | | | | |
| | weighted observations (uncorrected panel weights) | | | | | |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
| P90–95 | 1,954,971 | 1,955,020 | 1,955,011 | 1,954,985 | 1,955,003 | 1,954,995 |
| P95–99 | 1,563,996 | 1,563,977 | 1,563,986 | 1,563,983 | 1,563,999 | 1,564,024 |
| P99–99.9 | 351,897 | 351,895 | 351,889 | 351,899 | 351,889 | 351,875 |
| P99.9–99.99 | 35,190 | 35,190 | 35,189 | 35,190 | 35,190 | 35,191 |
| P99.99–100 | 3,910 | 3,910 | 3,910 | 3,910 | 3,909 | 3,909 |
| all | 18,579,870 | | | | | |
| | weighted observations (adjusted panel weights) | | | | | |
| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
| P90–95 | 2,300,000 | 2,300,000 | 2,300,000 | 2,300,000 | 2,300,000 | 2,300,000 |
| P95–99 | 1,840,000 | 1,840,000 | 1,840,000 | 1,840,000 | 1,840,000 | 1,840,000 |
| P99–99.9 | 414,000 | 414,000 | 414,000 | 414,000 | 414,000 | 414,000 |
| P99.9–99.99 | 41,400 | 41,400 | 41,400 | 41,400 | 41,400 | 41,400 |
| P99.99–100 | 4,600 | 4,600 | 4,600 | 4,600 | 4,600 | 4,600 |
| all | 21,858,671 | | | | | |

Notes: Adjusted panel weights correct panel weights for the attrition rate of 15%. See footnote 27.
Source: Own computation based on TPP 2001–2006.

Table A.4: Persistence rates in annual top income fractiles after 2001

| unconditional | | | | | | | |
|-----------------------|--------------|--------------|--------------|--------------|--------------|----------------|---------------------|
| fractile ^c | 1 | 2 | 3 | 4 | 5 | N ^a | sumwgt ^b |
| top 10 | 86.53 (0.05) | 81.59 (0.06) | 77.95 (0.07) | 74.73 (0.07) | 72.36 (0.07) | 399,064 | 4,600,000 |
| top 5 | 83.29 (0.07) | 77.82 (0.07) | 73.84 (0.08) | 70.46 (0.08) | 67.56 (0.08) | 327,816 | 2,300,000 |
| top 1 | 76.07 (0.09) | 70.19 (0.10) | 65.86 (0.10) | 61.90 (0.10) | 58.25 (0.11) | 217,823 | 460,000 |
| top 0.1 | 65.17 (0.26) | 59.64 (0.27) | 55.52 (0.27) | 51.97 (0.28) | 49.00 (0.28) | 32,778 | 46,000 |
| top 0.01 | 56.79 (0.86) | 52.72 (0.87) | 49.41 (0.87) | 46.34 (0.87) | 43.54 (0.86) | 3,321 | 4,600 |
| conditional | | | | | | | |
| fractile ^c | 1 | 2 | 3 | 4 | 5 | N ^a | sumwgt ^b |
| top 10 | 86.53 (0.05) | 78.10 (0.07) | 71.71 (0.07) | 65.79 (0.08) | 61.37 (0.08) | 399,064 | 4,600,000 |
| top 5 | 83.29 (0.07) | 73.57 (0.08) | 66.43 (0.08) | 60.38 (0.09) | 55.55 (0.09) | 327,816 | 2,300,000 |
| top 1 | 76.07 (0.09) | 64.10 (0.10) | 56.17 (0.11) | 49.80 (0.11) | 44.64 (0.11) | 217,823 | 460,000 |
| top 0.1 | 65.17 (0.26) | 52.36 (0.28) | 44.45 (0.27) | 38.45 (0.27) | 33.75 (0.26) | 32,778 | 46,000 |
| top 0.01 | 56.79 (0.86) | 44.95 (0.86) | 37.81 (0.84) | 31.88 (0.81) | 27.64 (0.78) | 3,321 | 4,600 |

Notes: ^aUnweighted/ ^bweighted observations in gross annual fractile 2001 (adjusted panel weights). Standard errors (analytic) in parenthesis.

Source: Own computation based on TPP 2001–2006.

Table A.5: Comparison of equalizing effect: TIM curve vs. relative reduction

| Germany 2001 – 2006: capital gains excluded | | | | | | | | | | |
|--|----------------------------|---------|---------|---------|---------|---------------------------|---------|---------|---------|---------|
| | TIM curve ^a (%) | | | | | relative ^b (%) | | | | |
| | 2001/06 | 2001/03 | 2002/04 | 2003/05 | 2004/06 | 2001/06 | 2001/03 | 2002/04 | 2003/05 | 2004/06 |
| top 10 | 0.74 | 0.43 | 0.40 | 0.41 | 0.40 | 2.62 | 1.55 | 1.46 | 1.45 | 1.41 |
| top 5 | 0.62 | 0.37 | 0.35 | 0.34 | 0.34 | 3.27 | 1.99 | 1.88 | 1.80 | 1.76 |
| top 1 | 0.41 | 0.25 | 0.23 | 0.22 | 0.23 | 4.93 | 3.18 | 2.95 | 2.73 | 2.66 |
| top 0.1 | 0.25 | 0.16 | 0.13 | 0.13 | 0.14 | 7.82 | 5.49 | 4.68 | 4.25 | 4.06 |
| Germany 2001 – 2006: capital gains included | | | | | | | | | | |
| | TIM curve ^a (%) | | | | | relative ^b (%) | | | | |
| | 2001/06 | 2001/03 | 2002/04 | 2003/05 | 2004/06 | 2001/06 | 2001/03 | 2002/04 | 2003/05 | 2004/06 |
| top 10 | 0.79 | 0.47 | 0.43 | 0.43 | 0.43 | 2.73 | 1.66 | 1.55 | 1.52 | 1.45 |
| top 5 | 0.67 | 0.41 | 0.38 | 0.37 | 0.37 | 3.42 | 2.16 | 2.01 | 1.89 | 1.82 |
| top 1 | 0.47 | 0.30 | 0.27 | 0.26 | 0.26 | 5.28 | 3.58 | 3.25 | 2.94 | 2.80 |
| top 0.1 | 0.32 | 0.21 | 0.18 | 0.17 | 0.18 | 8.94 | 6.54 | 5.57 | 4.86 | 4.60 |
| Norway 2001 – 2006 | | | | | | | | | | |
| | TIM curve ^a (%) | | | | | relative ^b (%) | | | | |
| | – | 2001/03 | 2002/04 | 2003/05 | 2004/06 | – | 2001/03 | 2002/04 | 2003/05 | 2004/06 |
| top 10 | – | 0.81 | 0.80 | 0.81 | 0.90 | – | 2.50 | 2.37 | 2.27 | 2.54 |
| top 5 | – | 0.73 | 0.71 | 0.78 | 0.91 | – | 3.25 | 2.97 | 2.96 | 3.53 |
| top 1 | – | 0.63 | 0.62 | 0.78 | 0.96 | – | 6.04 | 5.23 | 5.57 | 7.37 |
| top 0.1 | – | 0.56 | 0.56 | 0.67 | 0.76 | – | 13.02 | 10.45 | 9.94 | 12.54 |
| Norway 1970 – 2010 | | | | | | | | | | |
| | TIM curve ^a (%) | | | | | relative ^b (%) | | | | |
| | 1969/71 | 1979/81 | 1989/91 | 1999/01 | 2009/11 | 1969/71 | 1979/81 | 1989/91 | 1999/01 | 2009/11 |
| top 10 | 0.79 | 0.71 | 0.80 | 0.72 | 0.93 | 2.34 | 2.45 | 3.04 | 2.34 | 2.88 |
| top 5 | 0.55 | 0.52 | 0.59 | 0.61 | 0.85 | 2.68 | 3.01 | 3.72 | 2.93 | 3.90 |
| top 1 | 0.23 | 0.23 | 0.30 | 0.49 | 0.70 | 3.77 | 4.59 | 6.07 | 5.54 | 7.83 |
| top 0.1 | 0.09 | 0.09 | 0.13 | 0.40 | 0.45 | 6.45 | 8.91 | 12.04 | 11.90 | 15.41 |

Notes: ^aTop income mobility (TIM) curve as defined by Aaberge et al. (2013): absolute reduction of fractile's share in external income total when shares are assessed on permanent income, compared to averaged annual results (% of external income total). ^bRelative reduction in top income shares when shares are assessed on permanent income, compared to averaged annual results (% of averaged annual share).

Source: Germany: own computation based on TPP 2001–2006, German consumer price index, and German national accounts (Destatis, 2014a,c); Norway: Aaberge et al. (2013) and own computation based on Aaberge et al. (2013).

Appendix B Distribution Analysis for Subperiods

Table B.1: Annual distributional results

| capital gains excluded | | | | | | | | | | | | |
|--|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| lowest EGI in fractile ^a (1000 € in 2001 prices) | | | | | | | | | | | | |
| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | |
| top 10 | 59 | | 58 | | 58 | | 58 | | 59 | | 59 | |
| top 5 | 77 | | 76 | | 76 | | 76 | | 77 | | 78 | |
| top 1 | 141 | | 138 | | 137 | | 139 | | 144 | | 148 | |
| top 0.1 | 452 | | 414 | | 399 | | 424 | | 463 | | 490 | |
| top 0.01 | 1,910 | | 1,609 | | 1,518 | | 1,669 | | 1,951 | | 2,185 | |
| average EGI in fractile (1000 € in 2001 prices) | | | | | | | | | | | | |
| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | |
| top 10 | 102 | (0) | 99 | (1) | 99 | (1) | 100 | (1) | 104 | (1) | 107 | (1) |
| top 5 | 139 | (1) | 133 | (1) | 132 | (1) | 135 | (1) | 142 | (1) | 147 | (1) |
| top 1 | 306 | (2) | 283 | (2) | 276 | (2) | 290 | (3) | 317 | (4) | 339 | (4) |
| top 0.1 | 1,168 | (15) | 1,022 | (18) | 987 | (20) | 1,060 | (22) | 1,240 | (32) | 1,376 | (32) |
| top 0.01 | 4,815 | (132) | 4,150 | (173) | 4,098 | (191) | 4,378 | (205) | 5,354 | (309) | 6,111 | (309) |
| EGI shares (% of adjusted primary household income) ^c | | | | | | | | | | | | |
| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | |
| top 10 | 28.15 | (0.13) | 27.67 | (0.16) | 27.22 | (0.17) | 27.84 | (0.18) | 29.06 | (0.26) | 29.47 | (0.26) |
| top 5 | 19.04 | (0.10) | 18.50 | (0.12) | 18.14 | (0.13) | 18.72 | (0.14) | 19.76 | (0.20) | 20.26 | (0.20) |
| top 1 | 8.40 | (0.05) | 7.87 | (0.06) | 7.61 | (0.07) | 8.05 | (0.07) | 8.85 | (0.11) | 9.33 | (0.11) |
| top 0.1 | 3.21 | (0.04) | 2.84 | (0.05) | 2.72 | (0.06) | 2.95 | (0.06) | 3.46 | (0.09) | 3.79 | (0.09) |
| top 0.01 | 1.32 | (0.04) | 1.15 | (0.05) | 1.13 | (0.05) | 1.22 | (0.06) | 1.49 | (0.09) | 1.68 | (0.09) |
| capital gains included | | | | | | | | | | | | |
| lowest EGI in fractile ^a (1000 € in 2001 prices) | | | | | | | | | | | | |
| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | |
| top 10 | 59 | | 58 | | 58 | | 58 | | 59 | | 59 | |
| top 5 | 77 | | 76 | | 76 | | 76 | | 77 | | 78 | |
| top 1 | 142 | | 139 | | 138 | | 140 | | 145 | | 150 | |
| top 0.1 | 465 | | 429 | | 413 | | 439 | | 486 | | 518 | |
| top 0.01 | 2,026 | | 1,827 | | 1,646 | | 1,822 | | 2,204 | | 2,526 | |
| average EGI in fractile (1000 € in 2001 prices) | | | | | | | | | | | | |
| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | |
| top 10 | 103 | (0) | 101 | (1) | 100 | (1) | 102 | (1) | 108 | (2) | 110 | (1) |
| top 5 | 141 | (1) | 137 | (1) | 135 | (1) | 138 | (1) | 148 | (3) | 153 | (2) |
| top 1 | 315 | (2) | 300 | (3) | 289 | (3) | 303 | (3) | 348 | (8) | 365 | (5) |
| top 0.1 | 1,231 | (16) | 1,165 | (21) | 1,082 | (23) | 1,159 | (26) | 1,500 | (63) | 1,586 | (38) |
| top 0.01 | 5,156 | (138) | 5,162 | (194) | 4,741 | (219) | 5,022 | (249) | 7,376 | (619) | 7,502 | (365) |
| EGI shares (% of adjusted primary household income) ^c | | | | | | | | | | | | |
| | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | |
| top 10 | 28.44 | (0.14) | 28.19 | (0.18) | 27.63 | (0.19) | 28.26 | (0.21) | 30.01 | (0.51) | 30.30 | (0.31) |
| top 5 | 19.32 | (0.11) | 19.02 | (0.14) | 18.54 | (0.15) | 19.12 | (0.17) | 20.69 | (0.39) | 21.06 | (0.24) |
| top 1 | 8.65 | (0.06) | 8.34 | (0.07) | 7.96 | (0.08) | 8.41 | (0.09) | 9.71 | (0.21) | 10.06 | (0.13) |
| top 0.1 | 3.38 | (0.04) | 3.24 | (0.06) | 2.98 | (0.06) | 3.22 | (0.07) | 4.19 | (0.18) | 4.37 | (0.11) |
| top 0.01 | 1.42 | (0.04) | 1.44 | (0.05) | 1.31 | (0.06) | 1.40 | (0.07) | 2.06 | (0.17) | 2.07 | (0.10) |

Notes: Annual fractiles. Standard errors (analytic) in parenthesis. ^a Average of three (unweighted) lowest observations in fractile due to data anonymization. ^b Realized reported capital gains (see footnote 17). ^c Adjusted PHI: primary household income as reported in German national accounts, net of employers' SSC and including monetary social transfers.

Source: Own computation based on TPP 2001–2006, German consumer price index, and German national accounts (Destatis, 2014a,c).

Table B.2: Distributional results for subperiods (capital gains excluded^b)

| | lowest EGI in fractile ^a (1000 € in 2001 prices) | | | | | | | | |
|--|---|---------------------|-------------------|------------------------|---------------------|-------------------|------------------------|---------------------|-------------------|
| | 2001/03 | | 2002/04 | | 2003/05 | | 2004/06 | | |
| | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f |
| top 10 | 58 | 58 | 0.6 | 58 | 58 | 0.7 | 58 | 58 | 0.6 |
| top 5 | 76 | 76 | 0.8 | 76 | 76 | 0.8 | 76 | 77 | 0.8 |
| top 1 | 137 | 139 | 1.4 | 138 | 140 | 1.7 | 141 | 143 | 1.6 |
| top 0.1 | 411 | 422 | 2.6 | 412 | 429 | 2.1 | 450 | 459 | 2.0 |
| top 0.01 | 1,573 | 1,679 | 6.3 | 1,598 | 1,712 | 4.3 | 1,863 | 1,935 | 3.7 |
| average EGI (1000 € in 2001 prices) | | | | | | | | | |
| | 2001/03 | | 2002/04 | | 2003/05 | | 2004/06 | | |
| | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f |
| top 10 | 99 | 100 | (0) 1.5 | 98 | (1) 99 | (0) 1.5 | 100 | (1) 101 | (0) 1.5 |
| top 5 | 132 | (1) 134 | (0) 2.0 | 131 | (1) 133 | (1) 1.9 | 134 | (1) 136 | (1) 1.8 |
| top 1 | 279 | (2) 288 | (1) 3.2 | 275 | (2) 283 | (1) 3.0 | 286 | (3) 294 | (2) 2.7 |
| top 0.1 | 1,001 | (16) 1,059 | (10) 5.5 | 975 | (19) 1,023 | (12) 4.7 | 1,049 | (23) 1,096 | (14) 4.3 |
| top 0.01 | 4,003 | (146) 4,354 | (96) 8.1 | 3,939 | (178) 4,208 | (109) 6.4 | 4,332 | (225) 4,610 | (136) 6.0 |
| EGI shares (% of adjusted primary household income)^c | | | | | | | | | |
| | 2001/03 | | 2002/04 | | 2003/05 | | 2004/06 | | |
| | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f |
| top 10 | 27.25 | (0.13) 27.68 | (0.09) 1.5 | 27.17 | (0.16) 27.58 | (0.10) 1.5 | 27.63 | (0.19) 28.04 | (0.12) 1.5 |
| top 5 | 18.19 | (0.10) 18.56 | (0.07) 2.0 | 18.11 | (0.12) 18.45 | (0.07) 1.9 | 18.53 | (0.15) 18.87 | (0.09) 1.8 |
| top 1 | 7.71 | (0.05) 7.96 | (0.04) 3.2 | 7.61 | (0.06) 7.84 | (0.04) 3.0 | 7.95 | (0.08) 8.17 | (0.05) 2.7 |
| top 0.1 | 2.76 | (0.04) 2.93 | (0.03) 5.5 | 2.70 | (0.05) 2.84 | (0.03) 4.7 | 2.91 | (0.07) 3.04 | (0.04) 4.3 |
| top 0.01 | 1.11 | (0.04) 1.20 | (0.03) 8.1 | 1.09 | (0.05) 1.17 | (0.03) 6.4 | 1.20 | (0.06) 1.28 | (0.04) 6.0 |

Notes: Standard errors (analytic) in parenthesis. ^aAverage of three (unweighted) lowest observations in fractile due to data anonymization. ^bRealized reported capital gains (see footnote 17). ^cPHI as reported in German national accounts, net of employers' SSC and including monetary social transfers. ^dEach tax unit's permanent income in the respective period ^eAverage value of annual results in the respective period. See Table B.1 for annual results. ^fDifference between annual and permanent result (%), percentage defined with respect to averaged result. Source: Own computation based on TPP 2001–2006, German consumer price index, and German national accounts (Destatis, 2014a,c).

Table B.3: Distributional results for subperiods (capital gains included ^b)

| | lowest EGI in fractile ^a (1000 € in 2001 prices) | | | | | | | | | | | | |
|--|---|---------------------|-------------------|------------------------|---------------------|-------------------|------------------------|---------------------|-------------------|------------------------|---------------------|-------------------|-----|
| | 2001/03 | | 2002/04 | | 2003/05 | | 2004/06 | | | | | | |
| | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | | | | |
| top 10 | 58 | 58 | 0.5 | 58 | 58 | 0.6 | 58 | 58 | 0.7 | 58 | 59 | 0.5 | |
| top 5 | 76 | 76 | 0.8 | 76 | 76 | 0.8 | 76 | 77 | 0.8 | 77 | 77 | 0.8 | |
| top 1 | 138 | 140 | 1.4 | 139 | 139 | 1.3 | 139 | 141 | 1.4 | 143 | 145 | 1.4 | |
| top 0.1 | 425 | 436 | 2.5 | 417 | 427 | 2.2 | 437 | 446 | 2.0 | 474 | 481 | 1.4 | |
| top 0.01 | 1,709 | 1,833 | 6.8 | 1,655 | 1,765 | 6.2 | 1,806 | 1,891 | 4.5 | 2,089 | 2,184 | 4.4 | |
| average EGI (1000 € in 2001 prices) | | | | | | | | | | | | | |
| | 2001/03 | | 2002/04 | | 2003/05 | | 2004/06 | | | | | | |
| | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | |
| top 10 | 100 | 102 | (0) | 101 | 101 | (0) | 102 | 103 | (1) | 103 | 106 | (1) | 1.4 |
| top 5 | 134 | 137 | (1) | 136 | 136 | (1) | 137 | 140 | (1) | 140 | 146 | (1) | 1.8 |
| top 1 | 290 | 301 | (1) | 297 | 297 | (2) | 304 | 313 | (3) | 313 | 339 | (3) | 2.8 |
| top 0.1 | 1,084 | 1,159 | (12) | 1,135 | 1,145 | (14) | 1,186 | 1,247 | (22) | 1,247 | 1,415 | (25) | 4.6 |
| top 0.01 | 4,497 | 5,020 | (106) | 4,975 | 4,975 | (127) | 5,280 | 5,713 | (209) | 5,713 | 6,633 | (237) | 7.7 |
| EGI shares (% of adjusted primary household income)^c | | | | | | | | | | | | | |
| | 2001/03 | | 2002/04 | | 2003/05 | | 2004/06 | | | | | | |
| | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | permanent ^d | annual ^e | diff ^f | |
| top 10 | 27.63 | 28.09 | (0.10) | 28.03 | 28.03 | (0.11) | 27.59 | 28.03 | (0.17) | 28.63 | 29.52 | (0.20) | 1.4 |
| top 5 | 18.55 | 18.96 | (0.07) | 18.89 | 18.89 | (0.09) | 18.51 | 19.45 | (0.14) | 19.45 | 20.29 | (0.15) | 1.8 |
| top 1 | 8.02 | 8.32 | (0.04) | 8.24 | 8.24 | (0.05) | 7.97 | 8.69 | (0.07) | 8.69 | 9.40 | (0.08) | 2.8 |
| top 0.1 | 2.99 | 3.20 | (0.03) | 3.15 | 3.15 | (0.04) | 2.97 | 3.46 | (0.06) | 3.46 | 3.93 | (0.07) | 4.6 |
| top 0.01 | 1.24 | 1.39 | (0.03) | 1.38 | 1.38 | (0.04) | 1.26 | 1.59 | (0.06) | 1.59 | 1.84 | (0.07) | 7.7 |

Notes: Standard errors (analytic) in parenthesis. ^aAverage of three (unweighted) lowest observations in fractile due to data anonymization. ^bRealized reported capital gains (see footnote 17). ^cPHI as reported in German national accounts, net of employers' SSC and including monetary social transfers. ^dEach tax unit's permanent income in the respective period ^eAverage value of annual results in the respective period. See Table B.1 for annual results. ^fDifference between annual and permanent result (%), percentage defined with respect to averaged result. ^gSource: Own computation based on TPP 2001–2006, German consumer price index, and German national accounts (Destatis, 2014a,c).